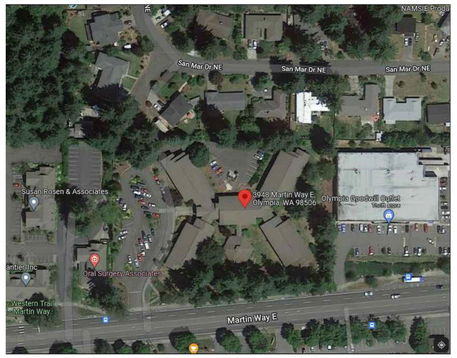
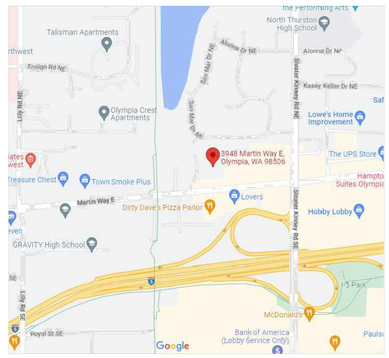
CASA MADRONA APARTMENTS

3948 MARTIN WAY EAST
OLYMPIA, WASHINGTON 98506



AERIAL PHOTO
NOT TO SCALE



VICINITY MAP
NOT TO SCALE

BOILER SYSTEM UPGRADES

SHEET LIST	
SHEET NUMBER	DESCRIPTION
M1.0	PROJECT COVER SHEET, AND SHEET LIST
M1.1	MECHANICAL EXISTING SCHEDULES
M1.2	TYPICAL APARTMENTS PIPING RISER DIAGRAM, PARTIAL ENLARGED TYPICAL CABINET HTR MECHANICAL PLAN AND DETAIL
M1.3	FIRST FLOOR - MECHANICAL PLAN
M1.4	SECOND FLOOR - MECHANICAL PLAN
M1.5	ENLARGED EXISTING BOILER ROOM PIPING PLAN AND PIPING SCHEMATIC DIAGRAM

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DAVID M. MOORE
STATE OF WASHINGTON
43283
REGISTERED
PROFESSIONAL ENGINEER
04/12/2024

PROJECT TITLE
CASA MADRONA BOILER SYSTEM UPGRADES

KING COUNTY HOUSING AUTHORITY

PROJECT ADDRESS
3948 MARTIN WAY EAST
OLYMPIA, WA 98506

REVISION	DATE
DWG ISSUE	DATE
BID SET	04-12-2024

SHEET TITLE
PROJECT COVER SHEET

DRAWN	SCM
CHECKED	DMM
TWE JOB #	230701
CLIENT JOB #	
SHEET SCALE	

SHEET NUMBER
M1.0
SHEET OF

230701 M1.0.dwg
4/12/2024 11:1

EXISTING PUMP SCHEDULE FOR REFERENCE ONLY

UNIT NO	MANUFACTURER / MODEL	LOCATION	SERVICE	TYPE	FLUID	FLOW (GPM)	MIN. FLOW (GPM)	HEAD (FT)	IMPELLER DIAM. (IN)	IMPELLER RPM	BHP	MOTOR HP	VOLT/ HP	OPERATING WEIGHT (LBS)	NOTES
P-1	B&G SERIES E-1510 1.25BC	BOILER RM	BUILDING HEATING LOOP	VERTICAL CLOSE COUPLED	WATER	62	12.4	58	7.875	1750	1.67	2	208V/3HP	200	1,2,3
P-2	B&G SERIES E-1510 1.25BC	BOILER RM	BUILDING HEATING LOOP	VERTICAL CLOSE COUPLED	WATER	62	12.4	58	7.875	1750	1.67	2	208V/3HP	200	1,2,3
CP-1	LOCHINVAR 1000208412 OR MAGNA 50-150	BOILER RM	BOILER B-1	INLINE CLOSE COUPLED-ECM MOTOR	WATER	52	25	25	-	-	-	5.6 AMPS	115V	25	4
CP-2	LOCHINVAR 1000208412 OR MAGNA 50-150	BOILER RM	BOILER B-1	INLINE CLOSE COUPLED-ECM MOTOR	WATER	52	25	25	-	-	-	5.6 AMPS	115V	25	4

EXISTING
NOTES: 1. PROVIDE VERTICAL FLOOR MOUNTED BASE.
2. PROVIDE INTEGRATED TECHNOLOGIC SENORLESS CONTROL WITH INTEGRATED VARIABLE FREQUENCY DRIVE.
3. PROVIDE DISCONECT BY E.C.
4. PROVIDE ECM MOTOR-MOTOR TO BE CONTROLLED BY BOILER.

EXISTING GAS BOILER SCHEDULE FOR REFERENCE ONLY

UNIT NO	MANUFACTURER / MODEL	LOCATION	SERVICE	TYPE	WATER					RELIEF VALVE		INPUT (MBH)	OUTPUT (MBH)	AHRI RATING	ELECTRICAL		VENT SIZE (IN)	OPERATING WEIGHT (LBS)	NOTES
					EWT (°F)	LWT (°F)	GPM	MIN. GPM	PD (FT)	QTY.	PRESSURE (PSI)				VOLT	MCA			
B-1	LOCHINVAR KBN701	BOILER RM	BUILDING HEATING	CONDENSING	145	170	52	25	20	1	50	700	685	95%	120V	12	6	500	1, 2, 3, 4, 5
B-2	LOCHINVAR KBN701	BOILER RM	BUILDING HEATING	CONDENSING	145	170	52	25	20	1	50	700	685	95%	120V	12	6	500	1, 2, 3, 4, 5

EXISTING
NOTES: 1. PROVIDE SIDEWALL VENT KIT, 100157613, SUITABLE FOR POLYPROPLYENE OR CPVC FLUE.
2. PROVIDE VARIABLE SPEED PUMP FOR BOILER SEE PUMP SCHEDULE. PROVIDE CONTROL FOR PUMPS.
- LOW WATER CUT-OFF W/MANUAL RESET AND TEST.
- MANUAL RESET HIGH LIMIT.
3. BOLT BOILER TO CONCRETE PAD, USE MASON SLAB ANCHOR BOLTS (6) 3/8"Ø WITH 2-5/8" EMBEDMENT.
4. MANUAL SHUTDOWN OF POWER TO BURNER CONTROLS REQUIRED PER ASME CDS-1-1998. REMOTE.
- SHUTDOWN VIA SWITCH OR CIRCUIT BREAKER REQUIRED.
- OUTSIDE EACH BOILER ROOM DOOR BY E.C.
5. PROVIDE CONDENSATE W/ NEUTRALIZER KIT.

EXISTING HYDRONIC UNIT HEATER SCHEDULE (SEE NOTES FOR NEW GPM VALVES ON SHEET M1.2, M1.3)

UNIT NO	MANUFACTURER	MODEL	AREA SERVED	SIZE L"xW"xH" (IN)	ELEMENT HEATING DATA						FAN		QTY	EXISTING NOTES	NEW NOTES
					EWT	LWT	EXISTING GPM	NEW GPM	MBH	WPD (FT)	AMPS (WATTS)	VOLTS			
BH-1	MODINE	S050	STAIRWELLS, UNIT BEDROOMS	60x5.25x12	180	170	1	0.8/0.6	3.8	-	-	-	87	1, 2, 3, 4, 6	
BH-2	MODINE	S0100	UNIT LIVING RM	120x5.25x12	180	165	1	0.6	7.7	-	-	-	70	1, 2, 3, 4, 6	
BH-3	MODINE	C006	COMMONS CORRIDORS	60x5.25x24	180	156	4	0.4	67	-	5	120	18	1, 2, 3, 4, 5, 7	
BH-4	MODINE	S050	OFFICES/ LAUNDRY	60x5.25x12	180	170	1	0.8	3.8	-	-	-	3	1, 2, 3, 4, 6	
BH-5	MODINE	C006	MAINTENANCE	48x12x24	180	156	4	2	67	-	5	120	4	1, 2, 3, 4, 5	
BH-6	MODINE	SL	GARBAGE RM	36x6x20	180	175	3	0.8	5	-	-	-	1	1, 2, 3, 4, 6	
BH-7	JOHNSON CONTROLS	FLX	COMMONS CORRIDORS	54x12x16.5	180	150	2.5	0.8	37	3.9	75	120	8	1, 2, 3, 4, 5, 8	9
BH-8	MODINE	S0160	UNIT LIVING RM	192x5.25x12	180	160	1.5	0.8	12.3	-	-	-	8	1, 2, 3, 4, 6	
BH-9	MODINE	S084	COMMUNITY RM	84x5.25x12	180	160	1	1	5.4	-	-	-	1	1, 2, 3, 4, 6	
BH-10	MODINE	S0160	COMMUNITY RM	132x5.25x12	180	160	1	1	8.5	-	-	-	2	1, 2, 3, 4, 6	

EXISTING NOTES:
1. EC TO CONNECT TO EXISTING POWER SUPPLY.
2. MC TO PROVIDE UNIT WITH BALANCING VALVE, DANFOSS TWA4200 (WHERE OTHERWISE NOT SPECIFIED) AND ISOLATION VALVES TO EACH UNIT. CONTRACTOR TO ADJUST GPM AS REQUIRED.
3. MC TO CONFIRM QUANTITIES, LOCATION, AND DIMENSIONS OF BASEBOARD UNITS.
4. PROVIDE UNIT WITH ACCESS PANEL.
5. PROVIDE UNIT FAN WITH PSC MOTOR.
6. COIL FINS PER FOOT SHALL BE 42. BASEBOARD ENCLOSURE SHALL BE CONTINUOUS AND HAVE A TIGHT FIT WITH OTHER COMPONENTS OF THE ENCLOSURE. ENCLOSURE COMPONENTS SHALL BE OF THE SAME MANUFACTURER. PROVIDE VALVE COMPARTMENTS A MINIMUM OF 18" LONG.
7. PROVIDE WITH MANUFACTURER'S TWO WAY VALVE PACKAGE AND MANUFACTURER'S REMOTE THERMOSTAT.
8. PROVIDE WITH MANUFACTURER'S THREE WAY VALVE PACKAGE AND MANUFACTURER'S REMOTE THERMOSTAT.

NEW NOTE:
9. PROVIDE TO ALL BH-7 LOBBY HEATERS FILTER, DISCONNECT, REPLACE SOLENOID VALVE. VERIFY SPEED POTENTIOMETER OPERATION, REPLACE IF DEFECTIVE - VERIFY FAN OPERATION REPLACE IF DEFECTIVE. PROVIDE CIRCUIT SETTER WITH P.T.PORTS SET TO 0.8 GPM.

NEW WORK REQUIRED IN APARTMENTS

1. RESET AND BALANCE THE FLOW CONTROL VALVE FOR EACH CORNER APARTMENT CONSISTING BH-1 AND BH-8 UNIT HEATER IN SERIES AT 0.8 GPM TOTAL. 8 VALVES IN TOTAL.
2. RESET AND BALANCE THE FLOW CONTROL VALVE FOR EACH INTERIOR APARTMENT CONSISTING BH-1 AND BH-2 UNIT HEATER IN SERIES AT 0.6 GPM TOTAL. 56 VALVES IN TOTAL.
3. RESET AND BALANCE THE FLOW CONTROL VALVE FOR EACH LOBBY CONSISTING BH-4 AND BH-7 UNIT HEATER IN SERIES AT 0.8 GPM TOTAL. 9 VALVES IN TOTAL.
4. RESET AND BALANCE THE FLOW CONTROL VALVE FOR EACH BH-3 HALL HEATER AT 0.4 GPM TOTAL. 8 VALVES IN TOTAL.
5. VERIFY T-STAT AND SOLENOID OPERATIONS IN EACH ROOM AFTER BALANCING IS COMPLETE.

NEW WORK REQUIRED IN MECHANICAL ROOM

1. SEE PLAN NOTES OM SHEET M1.5 FOR WORK IN MECHANICAL ROOM.

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04/12/2024

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KING COUNTY HOUSING AUTHORITY

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OLYMPIA, WA 98506

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DWG ISSUE	DATE
BID SET	04-12-2024

SHEET TITLE
EXISTING MECHANICAL SCHEDULES

DRAWN	SCM
CHECKED	DMM
TWE JOB #	230701
CLIENT JOB #	
SHEET SCALE	

SHEET NUMBER
M1.1
SHEET OF

230701.M1.1.dwg
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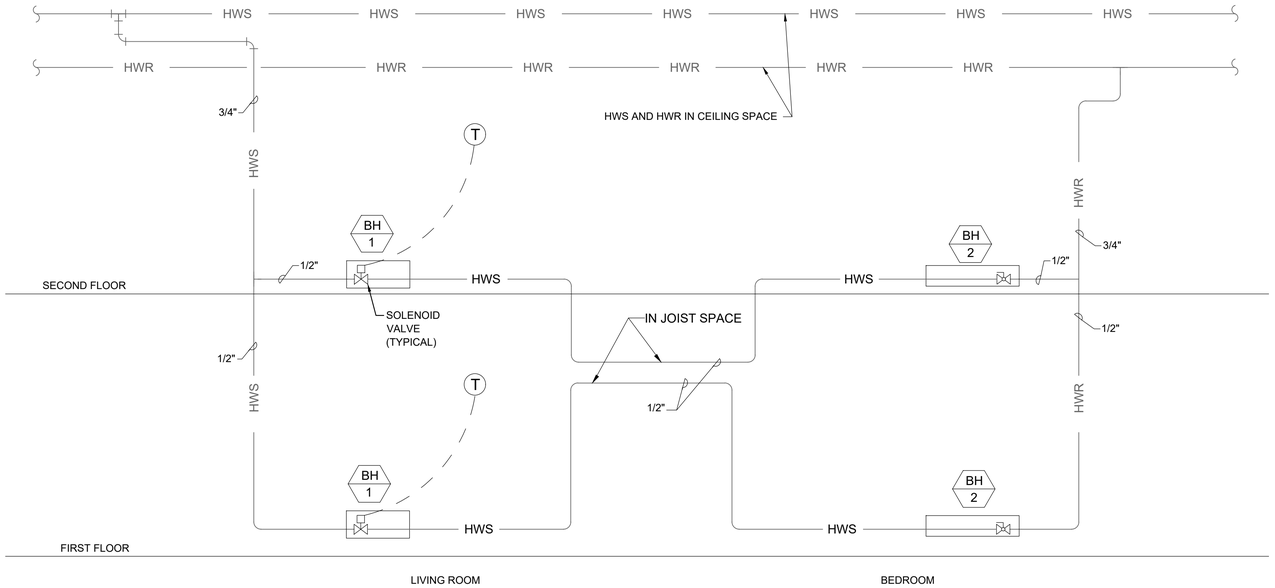
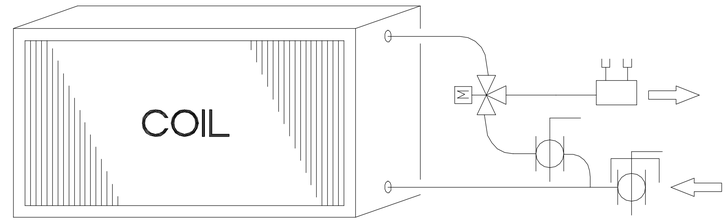


EXISTING TYPICAL APARTMENT PIPING RISER DIAGRAM

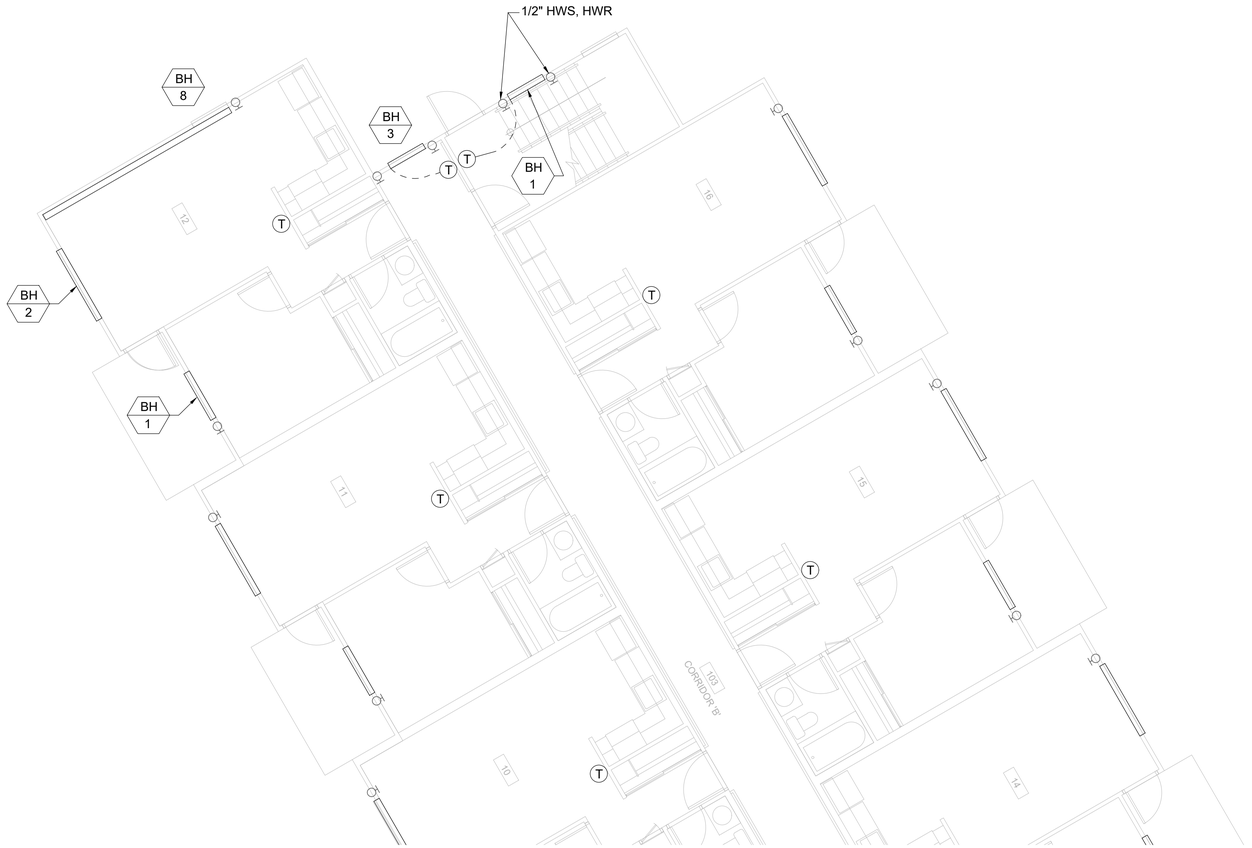
SCALE: NONE



3-WAY CONTROL VALVE, BALL VALVE IN BYPASS,
BALL VALVE WITH MEMORY STOP, AND ADJUSTABLE
FLOW SETTER

EXISTING TYPICAL CABINET HEATER PIPING DETAIL

SCALE: NONE



EXISTING PARTIAL ENLARGED TYPICAL CABINET HTR MECHANICAL PLAN

SCALE: 1/4" = 1'-0"

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SHEET TITLE
EXISTING TYPICAL
APARTMENT PIPING
RISER DIAGRAM,
PARTIAL ENLARGED
TYPICAL CABINET HTR
MECHANICAL PLAN

DRAWN	SCM
CHECKED	DMM
TWE JOB #	230701
CLIENT JOB #	
SHEET SCALE	

SHEET NUMBER

M1.2

SHEET OF

230701 M1.2.dwg
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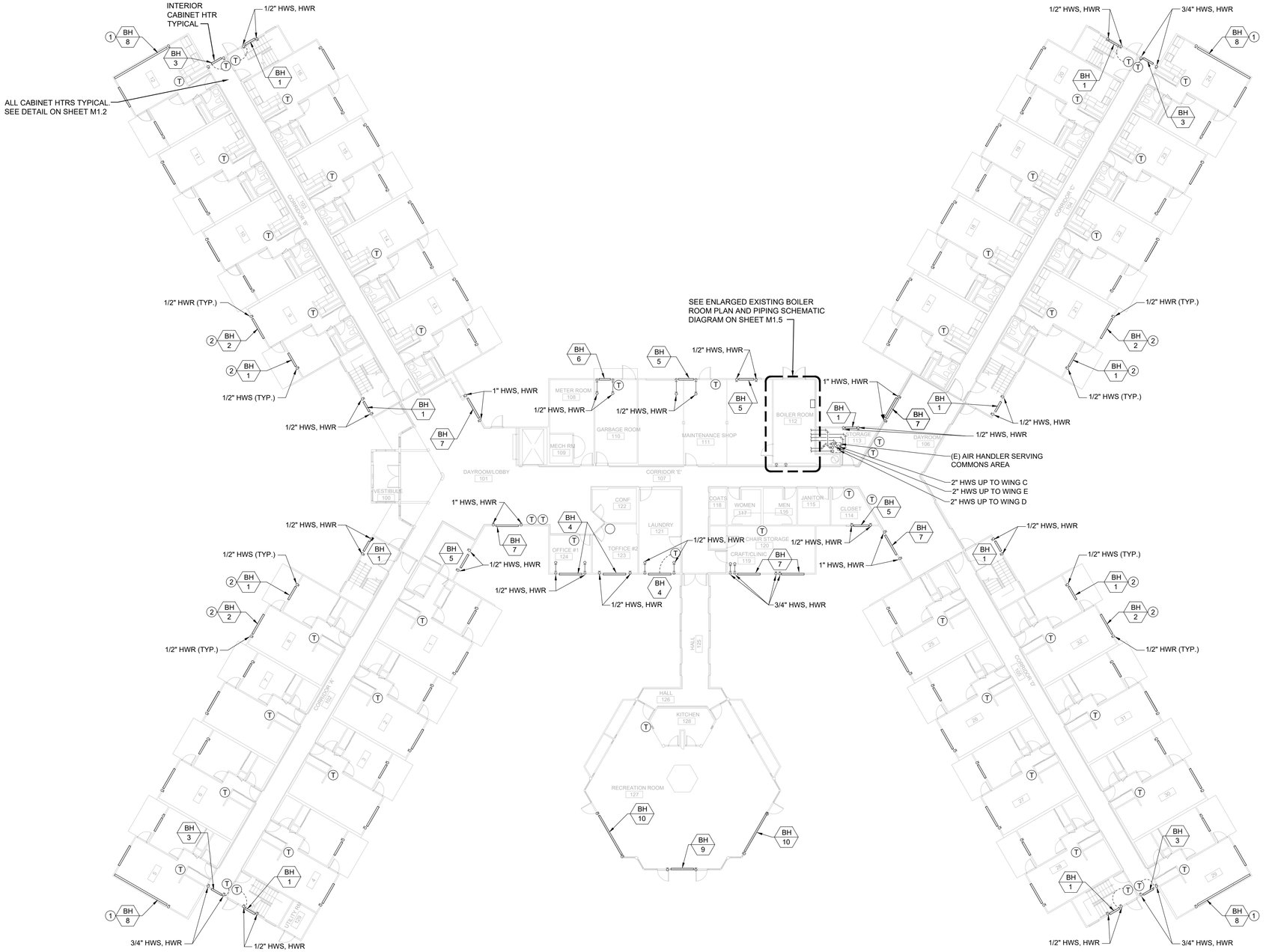
NEW CONSTRUCTION GENERAL NOTE

1. UNITS CALLOUTS ARE FOR EXISTING REFERENCE ONLY.

EXISTING PLAN NOTES

(1) BASEBOARD HEATER TYPICAL TO END UNITS ONLY.

(2) TYPICAL TO ALL LIVING UNITS.



FIRST FLOOR - MECHANICAL PLAN FOR REFERENCE

SCALE: 3/32" = 1'-0"

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SHEET TITLE
FIRST FLOOR - MECHANICAL PLAN FOR REFERENCE

DRAWN	SCM
CHECKED	DMM
TWE JOB #	230701
CLIENT JOB #	
SHEET SCALE	

SHEET NUMBER
M1.3
SHEET OF

230701.M1.3.dwg
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NEW CONSTRUCTION GENERAL NOTE

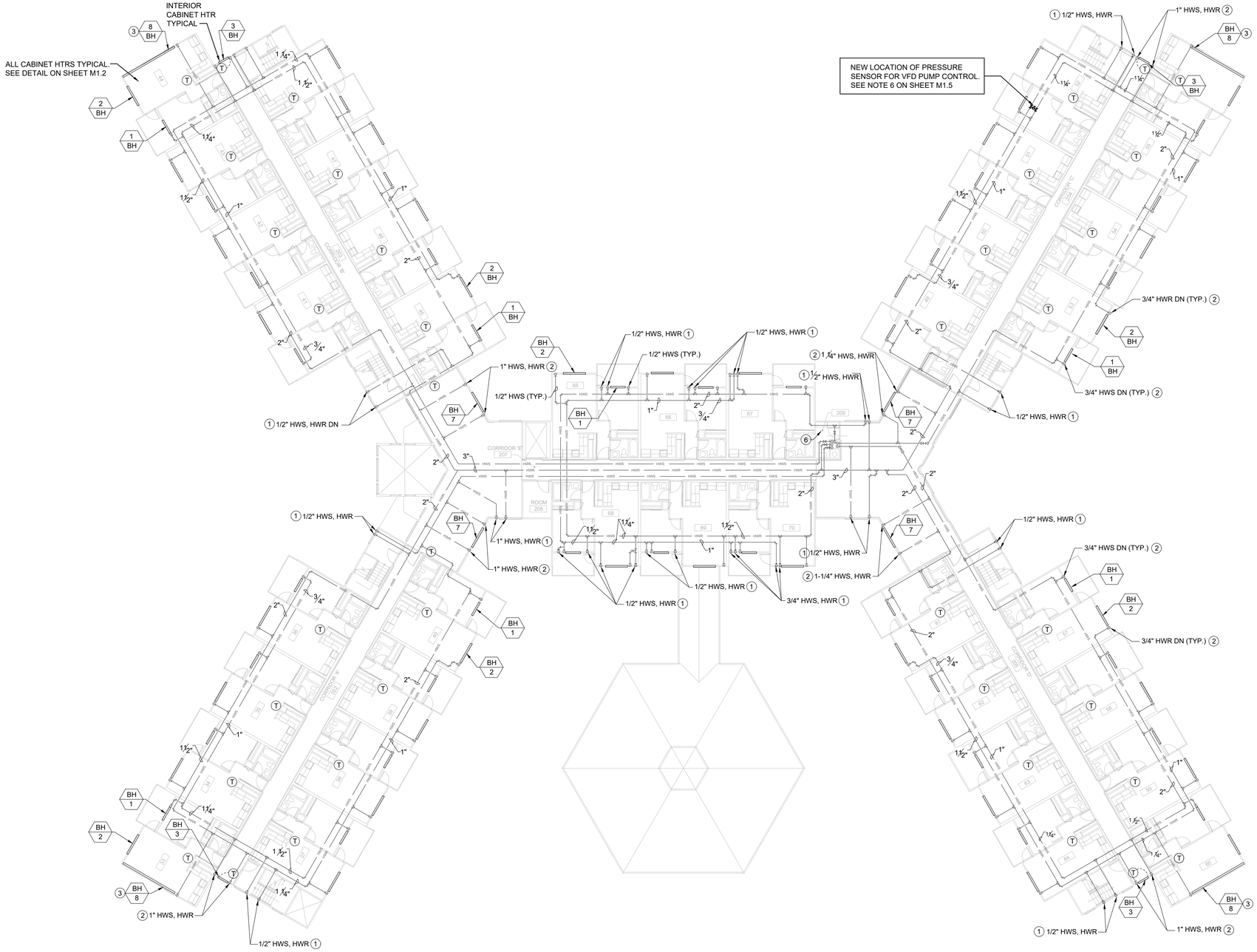
1. UNITS CALLOUTS ARE FOR EXISTING REFERENCE ONLY.

EXISTING PLAN NOTES

(1) HWS AND HWR DOWN TO SERVE FIRST FLOOR HEATERS ONLY.

(2) HWS AND HWR DOWN TO SERVE SECOND AND FIRST FLOOR HEATERS.

(3) BASEBOARD HEATER TYPICAL TO END UNITS ONLY.



SECOND FLOOR - MECHANICAL PLAN FOR REFERENCE

SCALE: 3/32" = 1'-0"

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SECOND FLOOR - MECHANICAL PLAN FOR REFERENCE

DRAWN	SCM
CHECKED	DMM
TWE JOB #	230701
CLIENT JOB #	
SHEET SCALE	

SHEET NUMBER

M1.4

SHEET OF

230701.M1.4.dwg
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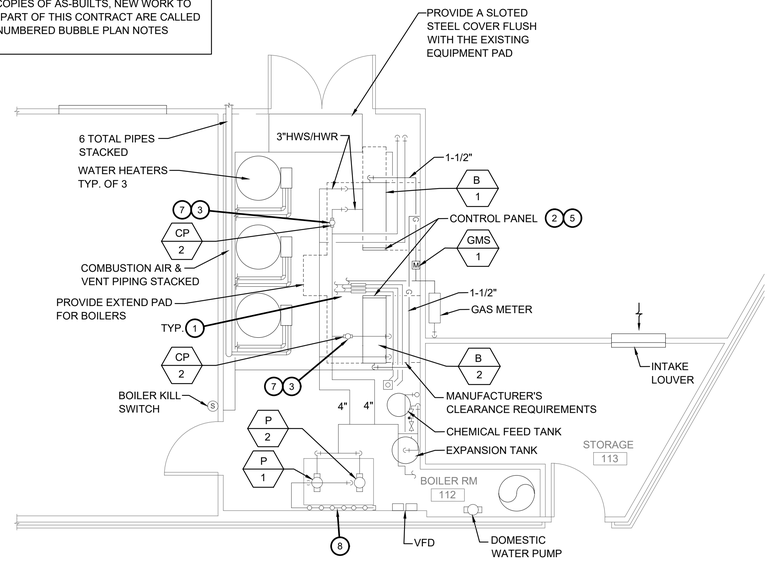
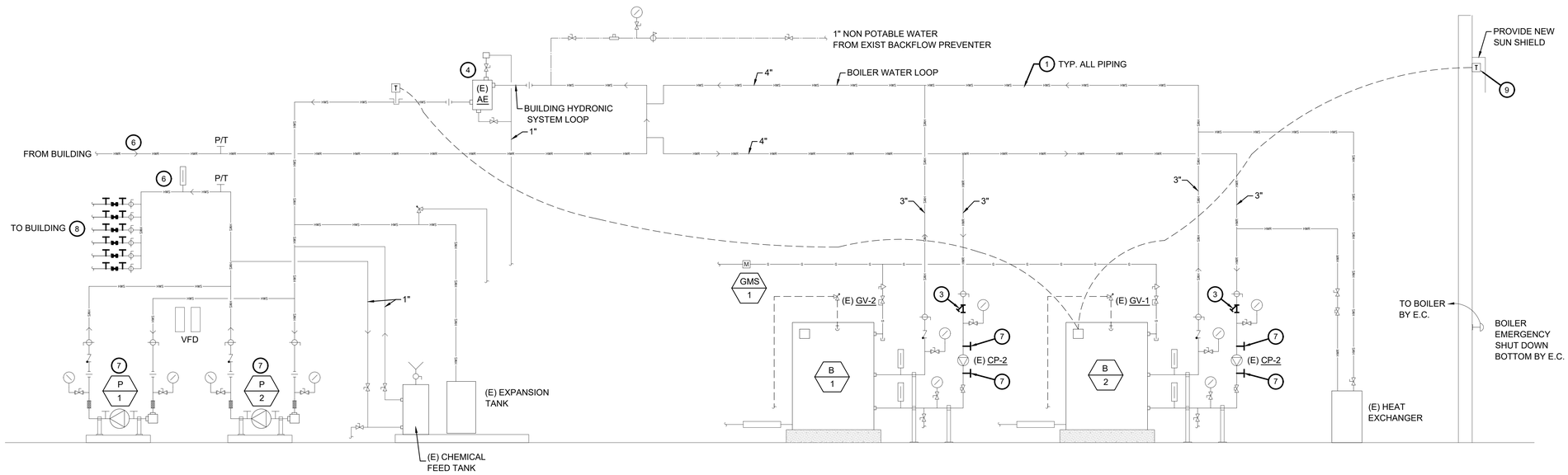
GENERAL NOTE:
PLANS ARE COPIES OF AS-BUILTS, NEW WORK TO BE DONE AS PART OF THIS CONTRACT ARE CALLED OUT IN THE NUMBERED BUBBLE PLAN NOTES



ENLARGED EXISTING BOILER ROOM PIPING PLAN

SCALE: 1/4" = 1'-0"



EXISTING BOILER ROOM PIPING SCHEMATIC DIAGRAM

SCALE: DIAGRAMMATIC

EXISTING SEQUENCE OF OPERATION

BOILER PLANT: BOILER PLANT SHALL BE RUN BY THE ON BOARD CONTROLS OF THE MASTER BOILER. BOILERS SHALL BE CONFIGURABLE SO THAT EITHER BOILER CAN BE THE MASTER BOILER.

1. THE MASTER BOILER SHALL CONTROL THE BOILER PLANT. THE MASTER BOILER SHALL START THE BOILER PLANT AT OUTSIDE AIR TEMPERATURES OF 65° F.
   - 1.1 START THE LEAD BUILDING CIRCULATION PUMP (P-1 OR P-2).
   - 1.2 SET THE PLANT HEATING WATER SUPPLY TEMPERATURE. PLANT HEATING WATER SUPPLY SHALL VARY FROM A LOW SE TINGS OF (120°F - ADJUSTABLE) TO A HIGH SETTINGS OF (170°F - ADJUSTABLE). AT OUTSIDE AIR TEMPERATURES OF 60°F OR HIGHER THE PLANT HEATING SUPPLY WATER SHALL BE AT THE LOW SETTINGS, AT OUTSIDE AIR TEMPERATURES OF 35°F OR LESS THE PLANT HEATING SUPPLY WATER SHALL BE THE HIGH SETTINGS. BETWEEN 60°F AND 35°F THE PLANT HEATING SUPPLY WATER TEMPERATURE SHALL VARY LINEARLY BETWEEN THE LOW AND HIGH SETTINGS WITH THE OUTSIDE AIR TEMPERATURE.

2. WHEN A BOILER RUNS IT'S CIRCULATION PUMP (CP-1 OR CP-2) SHALL RUN. CIRCULATION PUMPS SHALL BE CONTROLLED OFF A SIGNAL FROM THE BOILER CONTROL PANEL OF THE BOILER IT IS SERVING. BOILER CIRCULATION PUMPS SHALL MODULATE TO MATCH BOILER FIRING RATE, BUT NOT LESS THEN 50% SPEED.

3. THE MASTER BOILER SHALL LEAD LAG THE BOILERS TO KEEP RUN HOURS APPROXIMATELY EQUAL. THE MASTER BOILER SHALL STAGE THE BOILERS AND MODULATE THE FIRING RATES TO MEET THE HEATING SUPPLY WATER SET POINT.
   - 3.1 WHEN THE LEAD BOILER IS THE ONLY BOILER OPERATING, AND IT'S LOAD IS GREATER THAN 70% START THE LAG BOILER.
   - 3.2 WHEN THE BOTH BOILERS ARE OPERATING THEIR FIRING RATES SHALL BE IDENTICAL.
   - 3.3 WHEN THE BOTH BOILERS ARE OPERATING AND THEIR FIRING RATES ARE BELOW 25% THEN SHUT OFF THE LAG BOILER.

4. THE SYSTEM LEAD PUMP IS ENABLED ON A CALL FOR HEATING FROM ANY HEATING ZONE. MINIMUM RUN TIME IS 5 MINUTES (ADJUSTABLE). LEAD PUMPS SHALL STOP 5 MINUTES (ADJUSTABLE) AFTER ALL BOILERS STOP LAG PUMP SHALL START IF LEAD PUMP IS IN ALARM. SWITCH LEAD/LAG VIA SCHEDULE. DO NOT INTERRUPT SYSTEM ACTIVITY TO SWITCH LEAD/LAG.

NEW CONSTRUCTION PLAN NOTE

1. UNITS CALLOUTS ARE FOR EXISTING REFERENCE ONLY.

NEW CONSTRUCTION PLAN NOTES

INSIDE MECHANICAL ROOM

1. INSULATE BOILER LOOP PUMPS AND WATER LINES.
2. ADJUST BOILER RESET SCHEDULE. PROVIDE 180° WATER AT AN OUTDOOR TEMPERATURE OF 22° F AND BOILER SHUTDOWN AT 70°F. PROVIDE A LINEAR RESPONSE FOR TEMPERATURES BETWEEN 22°F AND 70°F.
3. DEMOLISH PIPING AS NEEDED AND PROVIDE Y-STRAINERS AT INLET OF BOILER PUMPS.
4. INSULATE AIR SEPARATOR.
5. REPROGRAM PUMPS VFD's TO CORRECTLY RESPOND TO HYDRONIC HEATING DIFFERENTIAL PRESSURE SENSORS. PROVIDE MINIMUM 20 FT HEAD PRESSURE AT END OF LOOP WITH ALL ROOM COILS OPEN OR CLOSED. CONFIGURE PUMPS TO RUN IN LEAD-LEG MODE.
6. RELOCATE HYDRONIC PIPING PRESSURE SENSOR FROM INSIDE THE MECHANICAL ROOM TOWARDS END OF SUPPLY LINE TO PROPERLY REFLECT SYSTEM PRESSURE AT LAST COIL. SEE SHEET M1.4 FOR REFERENCE
7. INSTALL PRESSURE TEST PORTS ON EACH SIDE OF PRIMARY LOOP PUMPS.
8. REPLACE CIRCUIT SETTERS AND BALANCE EACH SIX PRIMARY LOOP CIRCUIT SETTER VALVES. PROVIDE TEST PORTS ON EACH SIDE OF VALVES. INSULATE VALVES. RE-BALANCE CIRCUIT SETTER VALVES TO MEET FLOW REQUIREMENTS AFTER IN UNITS CIRCUIT SETTERS HAVE BEEN ADJUSTED.

AREAS OUTSIDE MECHANICAL ROOM

9. RELOCATE OUTSIDE AIR TEMPERATURE SENSOR TO BETTER REFLECT OUTDOOR TEMPERATURE.

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SHEET SCALE	

SHEET NUMBER

M1.5

SHEET OF